

# Understanding Animal Behavior

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## CONCEPT

## 1

# Understanding Animal Behavior

## Lesson Objectives

- Give examples of animal behavior.
- Explain why animal behavior is important.
- Describe innate behavior and how it evolves.
- List ways that behavior can be learned.

## Check Your Understanding

- What is an animal?
- Give examples of a wide variety of animals.

Do you have a dog or a cat? If you don't, you probably know someone that does. Think about how these animals act. Does the dog bark when it's excited? Does the cat purr when it's happy? Do they both play with toys?

## Examples of Animal Behavior

Barking, purring, and playing are just some of the ways that dogs and cats behave. These are examples of animal behavior. **Animal behavior** is any way that animals act, either alone or with other animals. Can you think of other examples of animal behavior? What about insects and birds? How do they behave? The pictures in **Figures 1.1, 1.2, 1.3, 1.4, 1.5, 1.6** and **1.7** show some of the ways that these and other animals act. Look at the pictures and read about the behaviors.

All of the animals pictured in the **Figures** here are busy doing something important. Read about what each animal is doing. Think about why the animal is behaving that way. These are just a few of the many ways that animals behave.

## Importance of Animal Behavior

Why do animals behave in these ways? The answer to this question depends on what the behavior is. A cat chases a mouse to catch it. A spider spins its sticky web to trap insects. A mother dog nurses her puppies to feed them. All of these behaviors have the same purpose: getting or providing food. All animals need food for energy. They need energy to move around. In fact, they need energy just to stay alive. Baby animals also need energy to grow and develop.

Birds and wasps build nests to have a safe place to store their eggs and raise their young. Many other animals build nests for the same reason. Animals protect their young in other ways, as well. For example, a mother dog not only

**FIGURE 1.1**

This cat is stalking a mouse. It is a hunter by nature.

**FIGURE 1.2**

This spider is busy spinning a web. If you have ever walked into a spider web, you know how sticky a spider web can be. Why do spiders spin webs?

nurses her puppies. She also washes them with her tongue and protects them from strange people or other animals. All of these behaviors help the young survive and grow up to be adults.

Rabbits run away from foxes and other predators to stay alive. Their speed is their best defense. Lizards sun themselves on rocks to get warm because they cannot produce their own body heat. When they are warmer, they can move faster and be more alert. This helps them escape from predators, as well as find food.

All of these animal behaviors are important. They help the animals get food for energy, make sure their young survive, or ensure that they survive themselves. Behaviors that help animals or their young survive increase the animals' fitness. You read about fitness in the *Evolution* chapter. Animals with higher fitness have a better chance of passing their genes to the next generation. If behaviors that increase fitness are controlled by genes, the behaviors

**FIGURE 1.3**

This mother dog is nursing her puppies. In what other ways do mother dogs care for their puppies?

**FIGURE 1.4**

This bird is using its beak to add more grass to its nest. What will the bird use its nest for?

become more common in the species. This is called evolution by natural selection.

## Innate Behavior

All of the behaviors shown in **Figures 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7** are ways that animals act naturally. They don't have to learn how to behave in these ways. Cats are natural-born hunters. They don't need to learn how to hunt. Spiders spin their complex webs without learning how to do it from other spiders. Birds and wasps know how to build nests without being taught. Behaviors such as these are called innate.

An **innate behavior** is any behavior that occurs naturally in all animals of a given species. An innate behavior is also



**FIGURE 1.5**

This wasp is starting to build a nest. Have you seen nests like this on buildings where you live? Why do wasps build nests?

**FIGURE 1.6**

This rabbit is running away from a fox. Did you ever see a rabbit run? Do you think you could run that fast?

called an **instinct**. The first time an animal performs an innate behavior, the animal does it well. The animal does not have to practice the behavior in order to get it right or become better at it. Innate behaviors are also predictable. All members of a species perform an innate behavior in the same way. From the examples described above, you can probably tell that innate behaviors usually involve important actions, like eating and caring for the young.

There are many other examples of innate behaviors. For example, did you know that honey bees dance? The honey bee in **Figure 1.8** has found a source of food. When the bee returns to its hive, it will do a dance, called the waggle dance. The way the bee moves during its dance tells other bees in the hive where to find the food. Honey bees can do the waggle dance without learning it from other bees, so it is an innate behavior.

Besides building nests, birds have other innate behaviors. One example occurs in gulls. A mother gull and two of her chicks is shown in **Figure 1.9**. One of the chicks is pecking at a red spot on the mother's beak. This innate behavior

**FIGURE 1.7**

This lizard is perched on a rock in the sun. Lizards like to lie on rocks and “sun” themselves. Do you know why?

**FIGURE 1.8**

When this honey bee goes back to its hive, it will do a dance to tell the other bees in the hive where it found food.

causes the mother to feed the chick. In many other species of birds, the chicks open their mouths wide whenever the mother returns to the nest. This is what the baby birds in **Figure 1.10** are doing. This innate behavior, called gaping, causes the mother to feed them.

Another example of innate behavior in birds is egg rolling. It happens in some species of water birds, like the graylag goose shown in **Figure 1.11**. Graylag geese make nests on the ground. If an egg rolls out of the nest, a mother goose uses her bill to push it back into the nest. Returning the egg to the nest helps ensure that the egg will hatch.

### Drawback of Innate Behavior

Innate behaviors such as these usually help animals or their offspring survive. Therefore, they increase fitness. This is why the behaviors evolved. However, innate behaviors have a drawback. The trouble with innate behaviors is that



**FIGURE 1.9**

This mother gull will feed her chick after it pecks at a red spot on her beak. Both pecking and feeding behaviors are innate.

**FIGURE 1.10**

When these baby birds open their mouths wide, the mother instinctively feeds them. This innate behavior is called gaping.

they are not flexible. An innate behavior is always performed exactly the same way.

The example of the graylag goose shows how this can be a problem. The sight of any nearby egg-shaped object will cause a graylag goose to push the object into her nest. She will push the object even if it isn't an egg. For example, if the mother goose sees a golf ball nearby, she will push it into her nest. This wastes time and energy that could be spent on the real eggs. From this example, you can see that innate behavior is not always helpful. It does not always increase fitness.

### Innate Behavior in Human Beings

All animals have innate behaviors, even human beings. Can you think of human behaviors that do not have to be learned? Chances are, you will have a hard time thinking of any. The only truly innate behaviors in humans are called **reflex behaviors**. They occur mainly in babies. Like innate behaviors in other animals, reflex behaviors in



**FIGURE 1.11**

This female graylag goose is a ground-nesting water bird. Behind her are two of her young chicks. Before the chicks hatch, the mother protects the eggs. She will use her bill to push eggs back into the nest if they roll out. This is an example of an innate behavior. How could this behavior increase the mother goose's fitness?

human babies may help them survive.

An example of a reflex behavior in babies is the sucking reflex. Newborns instinctively suck on a nipple that is placed in their mouth. It is easy to see how this behavior evolved. It increases the chances of a baby feeding and surviving.

Another example of a reflex behavior in babies is the grasp reflex. This behavior is shown in **Figure 1.12**. Babies instinctively grasp an object placed in the palm of their hand. Their grip may be surprisingly strong. How do you think this behavior might increase a baby's chances of surviving?

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## Learned Behavior

Just about all other human behaviors are learned and not innate. **Learned behavior** is behavior that occurs only after experience or practice. Learned behavior has an advantage over innate behavior. It is more flexible. Learned behavior can be changed if conditions change. For example, you probably know the route from your house to your school. Assume that you moved to a new house in a different place, so you had to take a different route to school. What if following the old route was an innate behavior? You would not be able to adapt. Fortunately, it is a learned behavior. You could learn the new route just as you learned the old one.

Although most animals can learn, animals with greater intelligence are better at learning and have more learned behaviors. Humans are the most intelligent animals. They depend on learned behaviors more than any other species. Other highly intelligent species include the apes, our closest relatives in the animal kingdom. You read about apes in the previous chapter. They include chimpanzees and gorillas. Both are also very good at learning behaviors.

You may have heard of a gorilla named Koko. Koko was raised by the psychologist Dr. Francine Patterson. Dr. Patterson wanted to find out if gorillas could learn human language. Starting when Koko was just one year old, Dr. Patterson taught her to use sign language. Koko learned to use and understand more than 1,000 signs. Koko showed how much gorillas can learn.

**FIGURE 1.12**

One of the few innate behaviors in human beings is the grasp reflex. It occurs only in babies.

Think about some of the behaviors you have learned. They might include riding a bicycle, using a computer, and playing a musical instrument or sport. You probably did not learn all of these behaviors in the same way. Perhaps you learned some behaviors on your own, just by practicing. Other behaviors you may have learned from other people. Humans and other animals can learn behaviors in several different ways. Some common ways of learning are habituation, observational learning, conditioning, play, and insight learning.

## Habituation

**Habituation** is learning to get used to something after being exposed to it for awhile. Habituation usually involves getting used to something that is annoying or frightening but not dangerous. Habituation is one of the simplest ways of learning. It occurs in just about every species of animal.

You have probably learned through habituation many times. For example, maybe you were reading a book when someone turned on a television in the same room. At first, the sound of the television may have been annoying. After awhile, you may no longer have noticed it. If so, you had become habituated to the sound.

Another example of habituation is shown in **Figure 1.13**. Crows and most other birds are usually afraid of people. They avoid coming close to people, or they fly away when people come near them. The crows landing on this scarecrow have gotten used to a “human” in this place. They have learned that the scarecrow poses no danger. They are no longer afraid to come close. They have become habituated to the scarecrow.

Can you see why habituation is useful? It lets animals ignore things that will not harm them. Without habituation,

**FIGURE 1.13**

This scarecrow is no longer scary to these crows. They have become used to its being in this spot and learned that it is not dangerous. This is an example of habituation.

animals might waste time and energy trying to escape from things that are not really dangerous.

## Observational Learning

**Observational learning** is learning by watching and copying the behavior of someone else. Human children learn many behaviors this way. When you were a young child, you may have learned how to tie your shoes by watching your dad tie his shoes. More recently, you may have learned how to dance by watching a pop star dancing on TV. Most likely you have learned how to do math problems by watching your teachers do problems on the board at school. Can you think of other behaviors you have learned by watching and copying other people?

Other animals also learn through observational learning. For example, young wolves learn to be better hunters by watching and copying the skills of older wolves in their pack. Another example of observational learning is how some monkeys have learned how to wash their food in the ocean. They learned by watching and copying the behavior of other monkeys.



## Conditioning

**Conditioning** is a way of learning that involves a reward or punishment. Did you ever train a dog to fetch a ball or stick by rewarding it with treats? If you did, you were using conditioning. Another example of conditioning is shown in **Figure 1.14**. This lab rat has been taught to “play basketball” by being rewarded with food pellets. Conditioning also occurs in wild animals. For example, bees learn to find nectar in certain types of flowers because they have found nectar in those flowers before.



**FIGURE 1.14**

This rat has been taught to put the ball through the hoop by being rewarded with food for the behavior. This is an example of conditioning. What do you think would happen if the rat was no longer rewarded for the behavior?

Humans learn behaviors through conditioning, as well. A young child might learn to put away his toys by being rewarded with a bedtime story. An older child might learn to study for tests in school by being rewarded with better grades. Can you think of behaviors you learned by being rewarded for them?

Did you ever hear the saying, “You can’t teach an old dog new tricks?” Don’t believe it. Older dogs—like older people—are capable of learning new behaviors. They may learn more slowly, but they can still learn to behave in new ways.

Conditioning does not always involve a reward. It can involve a punishment instead. A toddler might be punished with a time-out each time he grabs a toy from his baby brother. After several time-outs, he may learn to stop taking



his brother's toys. A dog might be scolded each time she jumps up on the sofa. After repeated scolding, she may learn to stay off the sofa. A bird might become ill after eating a poisonous insect. The bird may learn from this "punishment" to avoid eating the same kind of insect in the future.

### Learning by Playing

Most young mammals—including humans—like to play. Play is one way they learn skills they will need as adults. Think about how kittens play. They pounce on toys and chase each other. This helps them learn how to be better predators when they are older. Big cats also play. The lion cubs in **Figure 1.15** are playing and practicing their hunting skills at the same time. The dogs in **Figure 1.16** are playing tug-of-war with a toy. What do you think they are learning by playing together this way? Other young animals play in different ways. For example, young deer play by running and kicking up their hooves. This helps them learn how to escape from predators.



**FIGURE 1.15**

These two lion cubs are playing. They are not only having fun. They are also learning how to be better hunters.



**FIGURE 1.16**

They are really playing. This play fighting can help them learn how to be better predators.

Human children learn by playing, as well. For example, playing games and sports can help them learn to follow rules and work with others. The baby in **Figure 1.17** is playing in the sand. She is learning about the world through play. What do you think she might be learning?

**FIGURE 1.17**

Playing in a sandbox is fun for young children. It can also help them learn about the world. For example, this child may be learning that sand is soft.

## Insight Learning

**Insight learning** is learning from past experiences and reasoning. It usually involves coming up with new ways to solve problems. Insight learning generally happens quickly. An animal has a sudden flash of insight.

Insight learning requires relatively great intelligence. Human beings use insight learning more than any other species. They have used their intelligence to solve problems ranging from inventing the wheel to flying rockets into space. Think about problems you have solved. Maybe you figured out how to solve a new type of math problem or how to get to the next level of a video game. If you relied on your past experiences and reasoning to do it, then you were using insight learning.

One type of insight learning is making tools to solve problems. Scientists used to think that humans were the only animals intelligent enough to make tools. In fact, being able to make tools was thought to be one of the most important human traits. Tool making was believed to set humans apart from all other animals. Then, in 1960, primate expert Jane Goodall discovered that chimpanzees also make tools. She saw a chimpanzee strip leaves from a twig. Then he poked the twig into a hole in a termite mound. After termites climbed onto the twig, he pulled the twig out of the hole and ate the insects clinging to it (**Figure** below). The chimpanzee had made a tool to “fish” for termites. He had used insight to solve a problem. This chimpanzee was the first nonhuman primate ever observed to make tools. He was studied by Jane Goodall. He is eating termites from the “fishing pole” he made from a twig.

Since then, chimpanzees have been seen making several different types of tools. For example, they sharpen sticks and use them as spears for hunting. They use stones as hammers to crack open nuts. Scientists have also observed other species of animals making tools to solve problems. A crow was seen bending a piece of wire into a hook. Then the crow used the hook to pull food out of a tube. An example of a gorilla using a walking stick is shown in **Figure 1.18**. Behaviors such as these show that other species of animals—not just humans—can use their experience and reasoning to solve problems. They can learn through insight.

## Lesson Summary

- Animal behavior is any way that animals act, either alone or with other animals.

**FIGURE 1.18**

This gorilla is using a branch as a tool. She is leaning on it to keep her balance while she reaches down into swampy water to catch a fish.

- Behaviors that increase fitness can evolve through natural selection.
- Innate behavior is behavior that occurs naturally in all members of a species.
- Learned behavior is behavior that occurs only after experience or practice.

## Review Questions

### Knowledge and Comprehension

1. Give two examples of animal behavior.
2. Define innate behavior.
3. Identify one drawback of innate behavior.
4. What is learned behavior?
5. State three ways that behavior can be learned.

### Critical Thinking

1. Explain how egg rolling by graylag geese is likely to have evolved.
2. Describe how the grasp reflex might help a baby survive.
3. Explain how you could use conditioning to teach a dog to sit.
4. Why is play important for baby animals?
5. A crow was seen dropping nuts on a rock to crack the shells and then eating the nut meats. No other crows in the flock were ever observed cracking nuts in this way. What type of learning could explain the behavior of this crow?

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## Further Reading / Supplemental Links

CK-12 Foundation. *High School Biology*, Chapter 34, “Animal Behavior.”

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## Vocabulary

**animal behavior** Any way that animals act, either alone or with other animals.

**innate behavior** Any behavior that occurs naturally in all animals of a given species.

**instinct** Another term for an innate behavior.

**reflex behaviors** The only truly innate behaviors in humans, occurring mainly in babies.

**learned behavior** Behavior that occurs only after experience or practice.

**habituation** Learning to get used to something that is not dangerous after being exposed to it for awhile.

**observational learning** Learning by watching and copying the behavior of someone else.

**conditioning** Way of learning that involves a reward or punishment.

**insight learning** Learning from past experiences and reasoning.

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## Points to Consider

Did you ever watch a long line of ants marching away from their ant hill? What were they doing? How were they able to work together? What explains group behaviors such as this?